

NON-PUBLIC?: N  
ACCESSION #: 8910030081  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: South Texas, Unit 2 PAGE: 1 OF 3

DOCKET NUMBER: 05000499

TITLE: Reactor Trip Due to Full Closure of a Feedwater Isolation Valve  
During Partial Stroke Testing  
EVENT DATE: 08/23/89 LER #: 89-019-00 REPORT DATE: 09/22/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Charles Ayala - Supervising Licensing TELEPHONE: (512)972-8628  
Engineer

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

On August 23, 1989, Unit 2 was in Mode 1 at 100 percent power. At 0119 hours, Feedwater Isolation Valve C closed fully during a partial stroke surveillance test. The resultant loss of feedwater flow and decrease in steam generator level caused a reactor trip. The unit was stabilized in Mode 3 with no unexpected post trip transients. The cause of this event was a failure in the feedwater isolation valve control circuit which allowed it to stroke fully closed. The specific component which failed is unknown at this time. The failure did not affect the ability of the valve to perform its safety function. Further troubleshooting of the valve control circuits will be performed during the next scheduled maintenance outage. The feedwater valve control circuits are being reviewed to determine if modifications can be performed to reduce the potential for full closure of the valves during testing.

NL.LER89019.U2

END OF ABSTRACT

TEXT PAGE 2 OF 3

DESCRIPTION OF EVENT:

On August 23, 1989, Unit 2 was in mode 1 at 100 percent power. At 0119 hours, Feedwater Isolation Valve C closed fully during a partial stroke surveillance test. The resultant loss of feedwater flow to Steam Generator C caused a rapid decrease in level. The control room operators opened the preheater bypass and feedwater isolation bypass valves in an attempt to reestablish partial flow, however, the feedwater isolation bypass valve automatically closed on high flow. After approximately ten seconds, the feedwater isolation valve began to reopen and partial flow was established. By that time, steam generator level had decreased to approximately 33 percent and the reactor tripped on low steam generator level. All four feedwater isolation valves immediately closed and an auxiliary feedwater actuation occurred. The operators verified the reactor trip, turbine trip, power to the Engineered Safety Features busses and the auxiliary feedwater actuation. The Main Steam Isolation Valves were closed to limit the Reactor Coolant System cooldown. The plant was stabilized in Mode 3 at approximately 0140 hours. The NRC was notified of this event at 0149 hours.

Partial stroke testing of the Feedwater Isolation Valves is required to be performed quarterly by Technical Specifications and Section XI of the ASME Boiler and Pressure Vessel Code. Prior to the performance of the test on Feedwater Isolation Valve C, operators were stationed at the main control board, at the valve, and at each of two relay panels to observe relays which are actuated during the test. The control room operator depressed the valve test switch which initiated closure of the valve. Per the test procedure, once he observed dual valve position indication (red and green lights both illuminated) which confirmed that the valve was closing, he released the test switch which should have reopened the valve. However, the valve did not respond and continued to close in approximately five seconds.

The cause of this event was initially determined to be the failure of a valve limit switch which was designed to prevent closure of the valve beyond 90 percent during testing. The limit switch was repaired and the valve was successfully stroke tested. The unit was returned to service at 0430 hours on August 24, 1989. Further detailed root cause evaluation based on observations by the operators monitoring the original test determined that the failure of the 90 percent limit switch did not result in the valve stroking fully closed. The valve test control circuit is

designed to reopen the valve when the test switch is released, regardless of valve position. The 90 percent limit switch is provided to prevent valve closure if the test switch is not released. The cause of this event is now believed to be a failure in the control circuit.

#### CAUSE OF EVENT:

The cause of this event is unknown at this time. The most probable cause has been determined to be an intermittent component failure in the valve control circuit.

NL.LER89019.U2

TEXT PAGE 3 OF 3

#### ANALYSIS OF EVENT:

Reactor trip and Engineered Safety Features actuation is reportable pursuant to 10CFR50.73(a)(2)(iv). The plant was brought to a stable condition in Mode 3 with no unexpected post trip transients.

The feedwater isolation valves are required to close on demand to provide containment and feedwater isolation to mitigate design basis events. This function is verified once per quarter through partial stroke testing as required by Section XI of the ASME Boiler and Pressure Vessel Code. Each valve is equipped with redundant closing circuits which assure proper valve operation in the event of a single failure. Observation by the operators monitoring the test indicated proper operation of the redundant valve closure circuits. Failure of one of the two circuits to allow immediate reopening of the valve is not an indication of the inability of the valve to perform its ESF function which does not include opening. In its current configuration, the valve has been successfully tested and is capable of performing its safety function.

The only other valves which are subjected to partial stroke testing are the Main Steam Isolation Valves. These valves are equipped with a "slow close" testing feature which allows the valves to be stroked to their 90 percent open position at a reduced rate which allows more time for operator response in the event of a component failure. This minimizes the opportunity for MSIV testing to cause plant upsets or trips.

#### CORRECTIVE ACTION:

The following corrective actions are being taken as a result of this

event:

1. Further troubleshooting will be performed on the Feedwater Isolation Valve C control circuits during the next scheduled Unit 2 maintenance outage.
2. The feedwater isolation valve control circuits will be reviewed to determine if modifications should be made to decrease the possibility of full valve closure during testing. This action will be completed by November 15, 1989.

ADDITIONAL INFORMATION:

LER 89-016 reported a reactor trip which occurred during turbine steam inlet valve testing as a result of a failed valve limit switch.

NL.LER89019.U2

ATTACHMENT 1 TO 8910030081 PAGE 1 OF 2

The Light  
Company P.O. Box 1700 Houston, Texas 77001 (713) 228-9211  
Houston Lighting & Power

September 22, 1989  
ST-HL-AE- 3242  
File No.: G26  
10CFR50.73

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

South Texas Project Electric Generating Station  
Unit 2  
Docket No. STN 50-499  
Licensee Event Report 89-019 Regarding  
a Reactor Trip Due to Full Closure of a  
Feedwater Isolation Valve During Partial Stroke Testing

Pursuant to 10CFR50.73, Houston Lighting & Power (HL&P) submits the attached Licensee Event Report 89-019 regarding a reactor trip due to full closure of a feedwater isolation valve during partial stroke testing. This event did not have any adverse impact on the health and safety of the public.

If you should have any questions on this matter, please contact Mr. C.A. Ayala at (512) 972-8628.

R. W. Chewning  
Vice President  
Nuclear Operations

RWC/BEM/nl

Attachment: LER 89-019, South Texas, Unit 2

NL.LER89019.U2 A Subsidiary of Houston Industries Incorporated

ATTACHMENT 1 TO 8910030081 PAGE 2 OF 2

Houston Lighting & Power Company

ST-HL-AE- 3242  
File No.: G26  
Page 2

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